George C. Marshall Space Flight Center
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ED27-VIB-FOP-002
BASELINE
8/9/99

FACILITY OPERATING PROCEDURE

ED27 / Vibration, Acoustics, and Shock Team

CALIBRATION OF ACCELEROMETERS IN VIBRATION WEST

**CHECK THE MASTER LIST—
VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE**

Status (Baseline / Revision / Canceled)	Document Revision	Document Date	Description
Baseline		8/9/99	Document converted from ED73-VIB-FOP-002 Rev. A. Removed 'Annual' from title. Added to scope. Organizational changes. Reference document number changes.

1.0 INTRODUCTION

1.1 Purpose

The purpose of this procedure is to define the steps necessary for ED27 personnel to perform annual calibration of accelerometers to be used for vibration testing in Vibration West as required by MPG 8730.5 Control of Inspection, Measuring, and Test Equipment.

1.2 Scope

This document contains the steps to prepare the system, conduct the calibration, and document the results of calibration for accelerometers which have not been calibrated by the Calibration Laboratory.

2.0 DOCUMENTS

2.1 Applicable Documents

ED27-VIB-SOP-002 Control of Quality Records in Vibration West.

ED27-OWI-M&V-002 Quality Records Control

2.2 Reference Documents

MPG 8730.5 Control of Inspection, Measuring, and Test Equipment.

3.0 DEFINITIONS

None

4.0 EQUIPMENT REQUIRED

4.1 Equipment Required to be in Current Calibration

Standard Accelerometer, Endevco 2270, or equivalent
Digital Voltmeter, Keithley 193, or equivalent
Signal Conditioner, Endevco 2775A, or equivalent
Universal Counter, Hewlett-Packard 5316A, or equivalent

4.2 Additional Equipment Required

Power Amplifier, Ling 8036, or equivalent
Shaker, Ling 335, or equivalent
Signal Generator, Wavetek 132, or equivalent
Oscilloscope, Tektronics 2213A, or equivalent

5.0 PREPARATION

5.1 Record the identification and calibration dates for the items in Section 4.1.

5.2 Place conditioning amplifier switches in the following positions:

Operation	op
filter	out
input lo	gnd
lo freq	2 Hz

5.3 Connect signal generator output to the power amplifier.

5.4 Mount the standard accelerometer to the shaker and connect the output to the standard conditioning amplifier.

5.5 Dial the standard accelerometer sensitivity and a multiplier of 1 into the standard conditioning amplifier.

5.8 Set the signal generator to a sine wave and the output to 1 volt.

6.0 CALIBRATION (Repeat for each accelerometer)

6.1 Preparation

6.1.1 Connect the test accelerometer piggyback to the standard.

6.1.2 Connect the output of the test accelerometer to the test conditioning amplifier.

6.1.3 Connect the output of the test conditioning amplifier to the voltmeter.

6.1.4 Dial the nominal test accelerometer sensitivity and the appropriate multiplier into the test conditioning amplifier. Set the full scale range of the test conditioning amplifier to 10 g.

6.1.5 Turn the power amplifier gain up halfway.

6.2 Calibration

Using the values in Table 1, repeat steps 6.2.1 to 6.2.6 for each frequency.

6.2.1 Adjust the signal generator to the designated frequency.

6.2.2 Turn the signal generator output on.

6.2.3 Adjust the signal generator output until the output of the standard conditioning amplifier reads the designated voltage.

6.2.4 Adjust the transducer sensitivity on the test conditioning amplifier until its output reads the designated voltage.

6.2.5 Note the sensitivity.

6.2.6 Turn the signal generator output off.

Frequency (Hz)	15	30	50	100	300	500	1000	2000
g's	1.5	2.5	5	10	10	10	10	10
Voltage (mV)	150	250	500	1000	1000	1000	1000	1000

Table 1

7.0 POST CALIBRATION

7.1 Turn the power amplifier gain to 0.

7.2 Verify that no sensitivity reading varies from the 100 Hz reading by more than +/- 5%.

7.3 Record the 100 Hz reading as the accelerometer calibration.

8.0 QUALITY RECORDS

Calibration Records will be maintained as defined in ED27-VIB-SOP-002, Control of Quality Records in Vibration West.

9.0 NOTES

An out-of-calibration condition exists if any sensitivity reading in step 7.2 varies by more than +/- 5%. If the accelerometer has been calibrated before, a disposition report is required as per ED27-OWI-M&V-002, Quality Records Control.